UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,309	12/19/2001	Harry Anthony Leslie	20206-135 (P00-3281US)	1357

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EXAMINER
WOO, ISAAC M

ART UNIT	PAPER NUMBER
2172	

DATE MAILED: 05/05/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application N~~o~~		Applicant(s)
Office Action Summary	10/027,309		LESLIE, HARRY ANTHONY
	Examiner		Art Unit
	Isaac M Woo		2172

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 December 2001*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31 and 33-36* is/are rejected.

7)☒ Claim(s) *32* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____.

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   Preliminary amendment filed on 04/22/2002 has been entered. Pending claims

are 1-36.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 1-31 and 33-36 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Chaudhuri et al (U.S. Patent No. 6,363,371, hereinafter, "Chaudhuri")

in view of Beavin et al (U.S. Patent No. 6,272,487, hereinafter, "Beavin").

With respect to claim 1, 8, 21 and 31, Chaudhuri discloses, collecting a plurality

of single column statistics for a plurality of columns, the plurality of single column

statistics providing unique entry counts for a singe column operator, see (col. 1, lines

33-67, col. 6, lines 29-67 to col. 7, lines 1-52); selecting a first preferred single column

statistic from the plurality of single column statistics according to a first predetermined

criteria (col. 8, lines 4-67 to col. 9, lines 1-57, col. 11, lines 17-67 to col. 12, lines 1-34),

the columns are substantially independent each other, see (col. 1, lines 33-67, col. 6,

lines 29-67 to col. 7, lines 1-52); determining a second preferred single column statistic

from a first relationship of the single column statistics, see (col. 8, lines 4-67 to col. 9,

lines 1-57, col. 11, lines 17-67 to col. 12, lines 1-34); storing the first and second

preferred single column statistic, see (col. 4, lines 36-67 to col. 5, lines 1-67, col. 6, lines

47-67 to col. 7, lines 28); determining a selectivity estimate for predicates in the query

using the first and second preferred single column statistic, the selectivity estimate

being used in optimizing processing of the query by the database management system,

see (col. 11, lines 17-67 to col. 12, lines 1-24). Chaudhuri discloses, the plurality of

single column statistics providing unique entry counts for a singe column operator, see

(col. 1, lines 33-67, col. 6, lines 29-67 to col. 7, lines 1-52). Chaudhuri does not explicitly

disclose, the plurality of single column statistics providing an estimate of row counts.

However, Beavin discloses, "the cardinality for the concatenated columns COLX and

COLY is 5. A query which has the predicates, COLX=? AND COLY=? will have a

selectivity of 0.2 (i.e., 1 out of every 5 row is estimated to qualify) using this multi-

column statistics rather that s selectively of 0.05 which is obtained using single column

statistics and the independence assumption", see (col. 5, lines 52-67 to col. 6, lines 1-

24). And "Consequently the selectivity value is assumed to be a truer estimate of the

number of qualifying rows on which further query processing optimizations can be

based for better optimizations for certain queries", see (col. 4, lines 1-12). Therefore, it

would have been obvious to a person having ordinary skill in the art at the time of the

invention was made to include the plurality of single column statistics providing an

estimate of row counts in the system of the Chaudhuri. Because estimating the number

of the rows providing query costs and it improves query optimization for the costs of the

queries.

With respect to claims 2 and 9, Chaudhuri discloses, the predetermined criteria is

a maximum of unique entry counts, see (col. 8, lines 4-67 to col. 9, lines 1-57, col. 11,

lines 17-67 to col. 12, lines 1-34).

With respect to claims 3, 6, 10, 13 and 22, Chaudhuri discloses, determining a

cross product from the single column statistics; and calculating the selectivity estimate

as the division of the cross product and the maximum of unique entry counts, see (col.

8, lines 4-67 to col. 9, lines 1-57, col. 11, lines 17-67 to col. 12, lines 1-34).

With respect to claims 4 and 12, Chaudhuri discloses, the plurality of single

column statistics are selectivities, see (col. 1, lines 33-67, col. 6, lines 29-67 to col. 7,

lines 1-52).

With respect to claims 5 and 14, Chaudhuri discloses, the predetermined criteria

is a minimum of selectivities, see (col. 1, lines 33-67, col. 6, lines 29-67 to col. 7, lines 1-

52).

With respect to claims 7, 15, 19, 25 and 35, Chaudhuri discloses, the plurality of columns are dependent on each other, see (col. 1, lines 33-67, col. 6, lines 29-67 to col. 7, lines 1-52).

With respect to claim 11, Chaudhuri discloses, the first relationship of the single column statistics is a product of single column statistics, see (col. 1, lines 33-67, col. 6, lines 29-67 to col. 7, lines 1-52).

With respect to claims 17, 23, and 33, Chaudhuri discloses, the plurality of columns are substantially independent of each other, see (col. 8, lines 4-67 to col. 9, lines 1-57, col. 11, lines 17-67 to col. 12, lines 1-34).

With respect to claims 18 and 20, Chaudhuri discloses, the selectivity estimate is substantially equal to the first preferred single column statistic, see (col. 8, lines 4-67 to col. 9, lines 1-57, col. 11, lines 17-67 to col. 12, lines 1-34).

With respect to claims 24-27, Chaudhuri discloses, the selectivity estimate range is substantially equal to the first selectivity, second, see (col. 8, lines 4-67 to col. 9, lines 1-57, col. 11, lines 17-67 to col. 12, lines 1-34).

With respect to claims 28-29, 34 and 36, Chaudhuri discloses, the estimate of the dependency of the columns is used to determine the third selectivity estimate, see (col. 8, lines 4-67 to col. 9, lines 1-57, col. 11, lines 17-67 to col. 12, lines 1-34).

With respect to claim 30, Chaudhuri discloses, the third selectivity estimate is chosen to be in a central range between the first and second selectivity estimates, see (col. 1, lines 33-67, col. 6, lines 29-67 to col. 7, lines 1-52).

Allowable Subject Matter

4.   Claim 32 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

5.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ziauddin (U.S. Patent No. 6,029,163) discloses the system for collecting query workload based statistics within a relational database management system (RDBMS) and for identifying columns for which statistics collection is to be performed. The novel

system collects workload statistics that are dependents on multiple columns, rather than merely single columns. Multi-column statistic generation provides more accurate results for columns having correlated data, and therefore leads to better estimated cost analysis by an RDBMS optimizer. In one embodiment, a column duplicity factor is based on an analysis of distinct data rows, e.g., combinations of values within multiple columns, rather than rows of single columns. The novel system also collects separate statistics regarding the presence of null data within the rows of a column group. Separate null data statistics improve the determined result carnality used by the RDBMS optimizer because the cardinality of a relational operation's result is generally determined by the number of input rows with non-null data. The novel system includes an RDBMS optimizer that automatically identifies column groups and column groups on which workload statistics are to be generated.

SHAHID ALAM
PRIMARY EXAMINER

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Isaac M Woo whose telephone number is (703) 305-0081. The examiner can normally be reached on 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E Breene can be reached on (703) 305-9790. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

IMW
April 26, 2004

SHAHID ALAM
PRIMARY EXAMINER